

Intercloud platform for connecting and managing heterogeneous services with applications for e-health

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Grid, Cloud & High Performance
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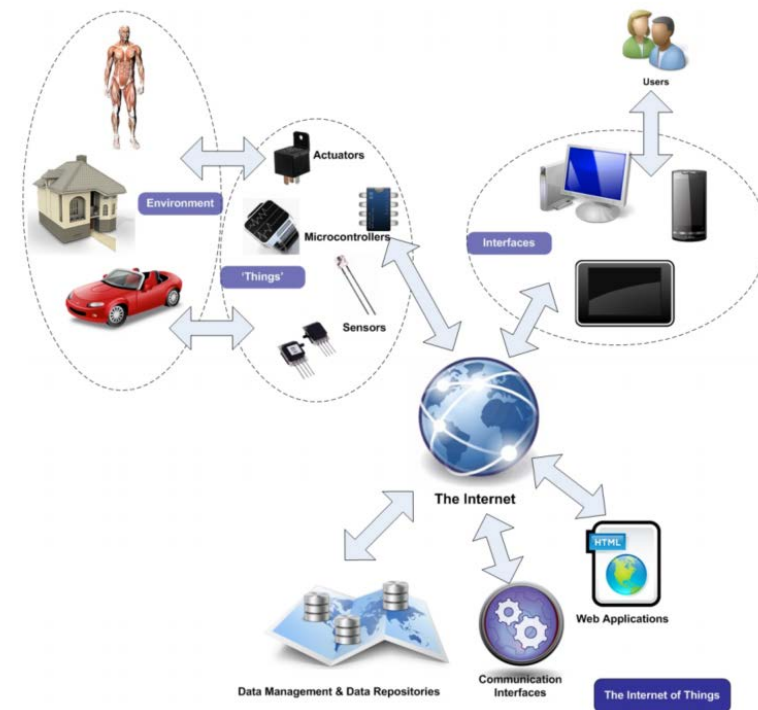
Outline



- Context
- Objectives
- Intercloud
- Experimental scenario
- Conclusions

Context

- Internet of Things (IoT)
 - environment for information
 - devices, sensors
 - applications
- Cloud computing technology
 - Sharing resources
 - High scalability
 - Elasticity
 - Pay as you go
 - Self-provisioning of resources

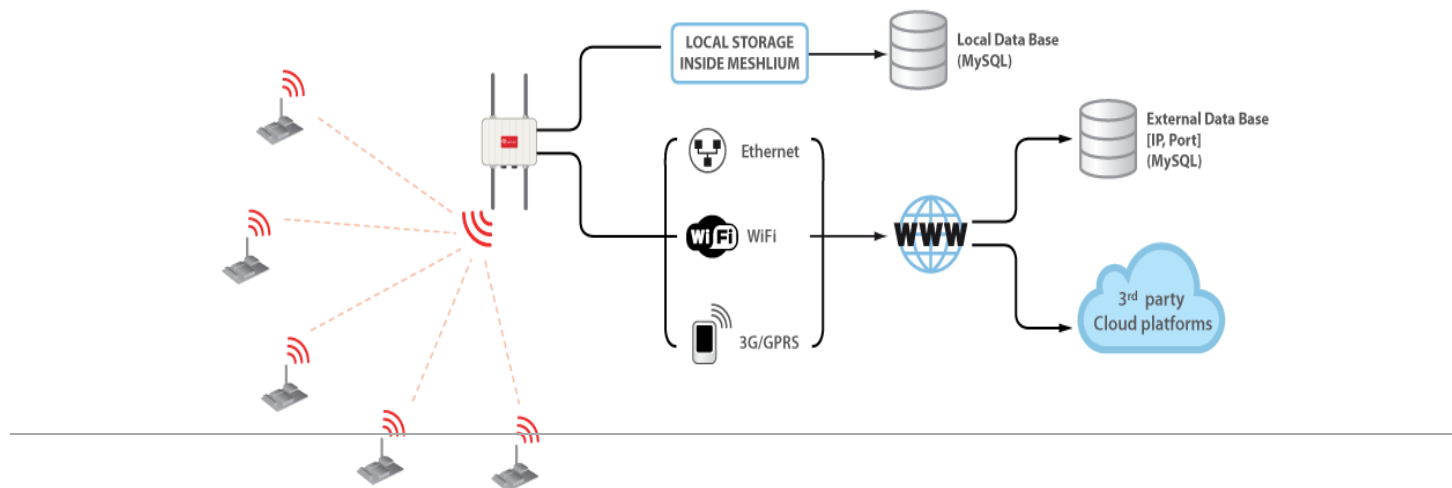


Source: Vouk, 2008

Context

- **Brained City project**

- **QoS Sensitive Frameworks over Heterogeneous Networks**
 - Self-Adaptive Bandwidth Reconfiguration & Admission Control
- **ClujIT Cluster POSCCE project: E-Health WSN Middleware**
 - Libelium sensors
 - Medical devices
 - Interconnection of heterogeneous devices





Objectives

- Intercloud research
- Propose an **architecture** for interconnection of hybrid and heterogeneous services
 - aim: offering **enhanced services & scalable and flexible infrastructure**
- Experimental scenario
 - **E-health prototype (software and hardware) for monitoring a basic medical device**

Intercloud

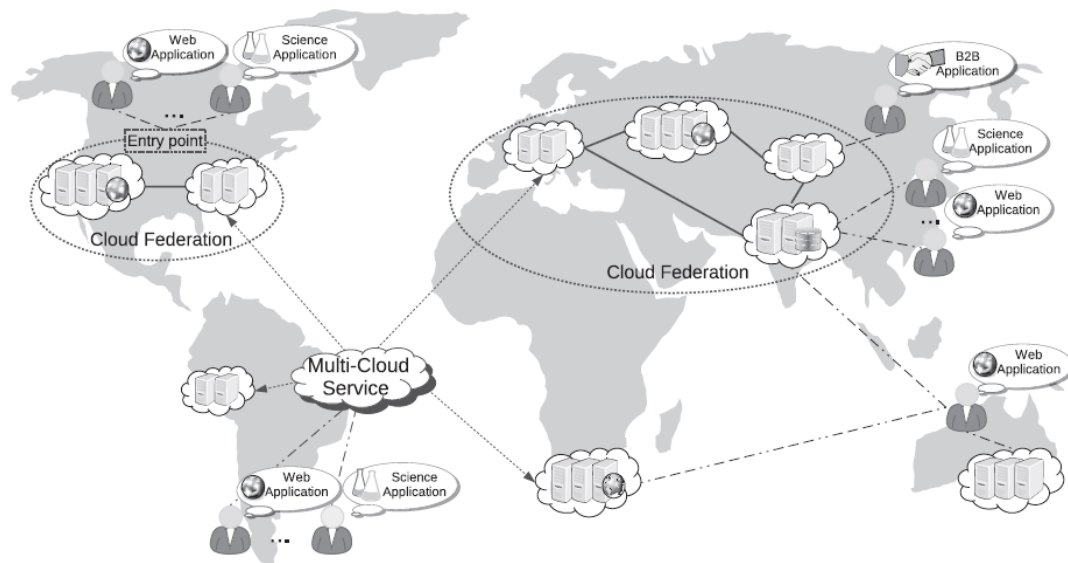
- **Intercloud (Bernstein, 2009).**
 - every cloud has limited calculation resources in a certain geographical region
- **Intercloud = interconnected cloud systems**
 - **key concept**
 - a cloud by itself does not have infinite natural resources or stable geographic location.
 - **improve efficiency and accuracy**
 - real-time transmission of information

Intercloud

- **Cloud evolution**

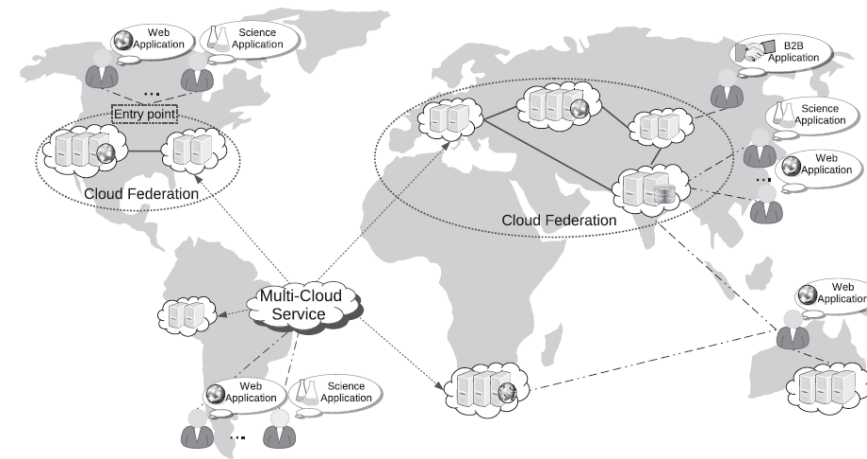
- **Definiton**

- cloud model
- guarantees QoS
- on-demand reassignment of resources and transfer of workload
- interworking cloud systems of different cloud providers
- SLA and use of standard interfaces.



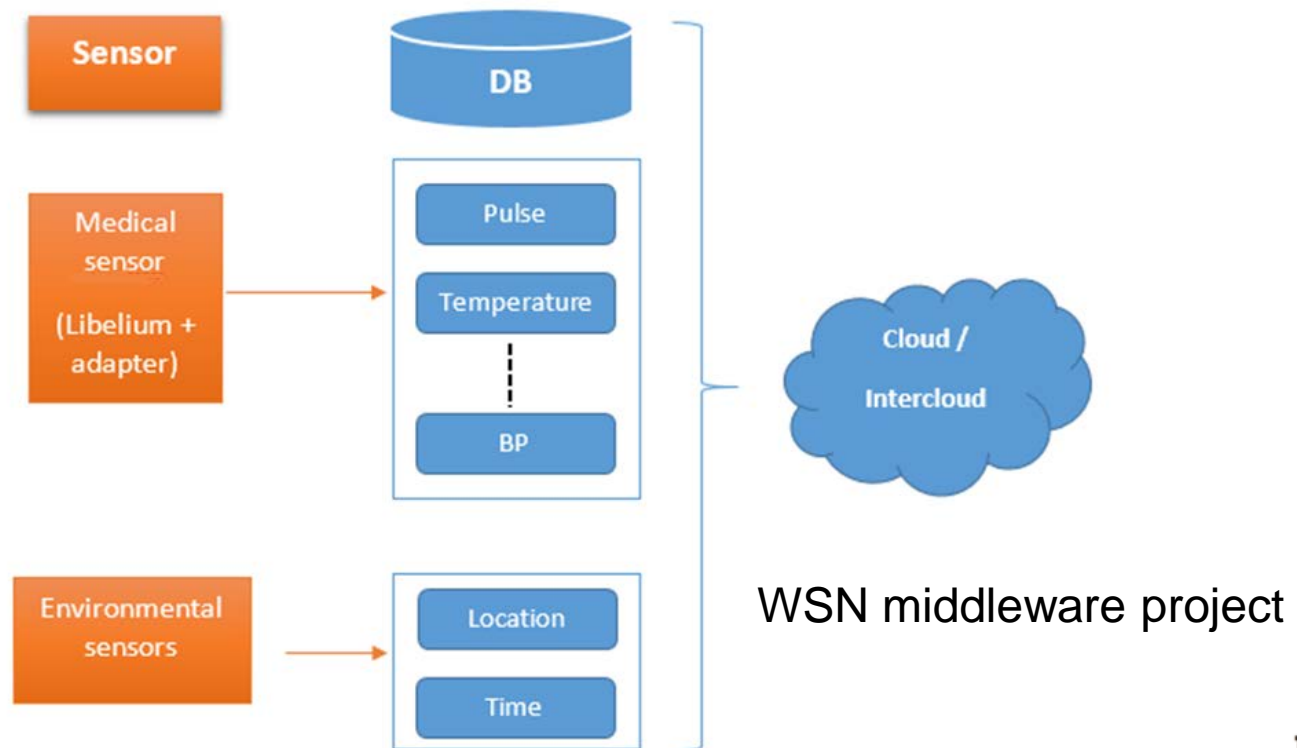
Intercloud

- **Open interfaces**
 - administer the exchange and the portability of data between clouds.
- **Challenge**
 - communication between different clouds
- **Standardization:**
 - cloud interoperability;
 - standardizing of APIs
 - communication protocols
 - *IEEE P2302 Working Group*



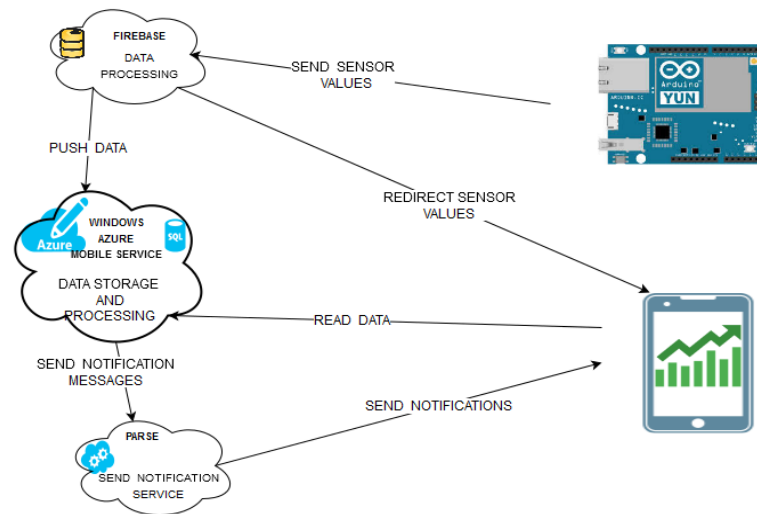
Experimental scenario

- Illustrate the interaction between cloud services
- E-health **prototype**



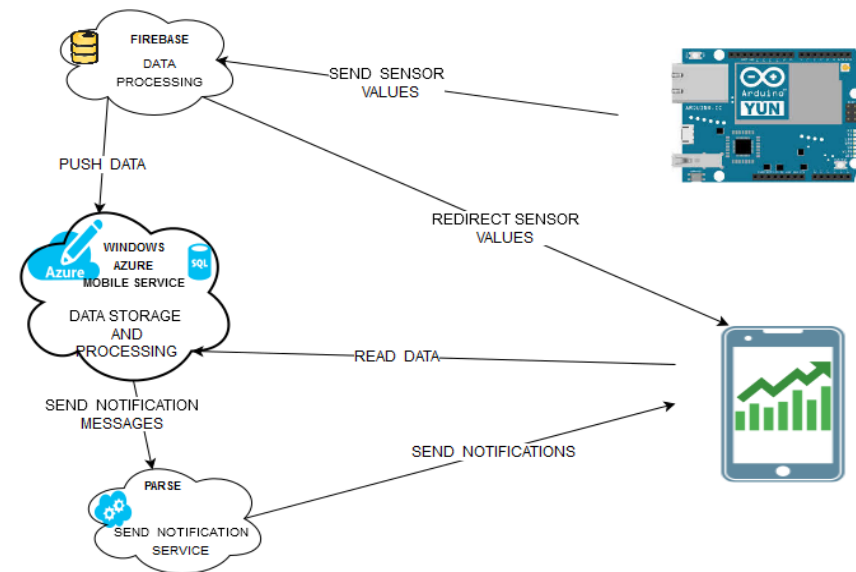
Experimental scenario

- **Hardware and software components**
 - **Hardware:** Arduino Yun OpenWRT, Pulse Sensor, mobile devices
 - **Software:** process and store data, business logic of events and relaying the notification messages



E-health prototype

- **Intercloud communication**
 - **Firebase service:**
 - Events management
 - Real time transmission to mobile devices
 - **Mobile Microsoft Azure Service**
 - storing and processing big data
 - process data in order to determine notifying decisions
 - **Parse**
 - specialized in notification messages - mobile devices.



Conclusions

- Recent Intercloud initiatives
 - centered on resource management
- Paper's focus
 - design and development of a **services centered architecture**
 - **showcasing** a connectivity solution of heterogeneous cloud services
 - scalable architecture
 - services provided to clients in a transparent way
 - rapid deployment and integration

Conclusions

- **Standards - available for cloud technology**
- **Intercloud standardization**
 - **Early stages (IEEE P2302)**
- **Need for**
 - **open standards**
 - **strategies for binding different standards**
 - **verification sequences of the combined inter-operativity**

Thank you!

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